## MS38-P01 | CdTe based 2D detectors for hard radiation

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There is a growing need for hard energy X-rays in diffraction and imaging applications, both for laboratory instruments and at synchrotron beam lines.

Hybrid pixel detectors, the new gold standard for two-dimensional X-ray detection, are generally equipped with Si sensors, severely limiting the detection efficiency when working with hard radiation. For example, for 22 keV photons (Ag K-Alpha) the efficiency of a detector equipped with a Si sensor of 300 micrometer thickness is only about 20%. Using thicker silicon sensors will increase the efficiency somewhat but to get efficiency close to 100%, or go to higher energies, other type of sensor materials are needed. With Cadmium Telluride (CdTe), a sensor 750 micrometer thickness has 100% efficiency up to 60 keV. Another advantage of CdTe is that it protects the sensitive readout circuitry below the sensor against potential radiation damage.

CdTe as a sensor material comes with its own challenges, however. Its crystalline quality is lower than a Si sensor. It needs to be cooled for optimal performance. We have been working with this material for many years, and optimized the detector design specifically for this sensor. In this contribution, the challenges of working with CdTe are being explained, and examples of the unique technology are shown.